Class I, HEXAPODA.

Order XI, ORTHOPTERA.

Order XII, DERMAPTERA.

REPORT ON THE ORTHOPTERA OF TRINIDAD, WEST INDIES.

By Lawrence Bruner,

Lincoln, Nebraska.

Several years ago Mr. H. D. Chipman collected insects on the Island of Trinidad, British West Indies, and the writer secured a fairly complete set of the Orthoptera taken by him. Since that time a few additional forms have been obtained from G. E. Tryhane, of St. Anne's, Trinidad, and others from W. E. Broadway, of St. George's Grenada, who formerly collected on Trinidad. Altogether upwards of one hundred (112) species have thus been accumulated and form the basis of this paper.

Unlike others of the West Indies, this island is more closely related to the South American mainland in its fauna than they. Still a rather large number of new forms are described herewith, showing how very interesting is the study of island faunas, although but little removed from the mainland.

In 1892 Brunner von Wattenwyl and Prof. Joseph Redtenbacher published a paper on the Orthoptera of the Island of St. Vincent.* A little more than a year later Brunner von Wattenwyl reported on the Orthoptera of Grenada.† In the former paper fifteen and in the latter nine new species were described. Quite recently Mr. Jas. A. G. Rehn published some "Notes on West Indian Orthoptera, with a List of the Species Known from the Island of Porto Rico."‡

In the first-mentioned paper 62, in the second 56 and in the last 59 species are listed. Aside from these faunal papers on the Orthop-

* Proc. Zoöl. Soc. Lond., 1892, No. XV, pp. 196–222, Pls. xv–xvii.

† *Ib.*, 1893, pp. 599–611, Pl. lii.

‡ Trans. Amer. Ent. Soc., XXIX, pp. 129–136 (1903).

tera of the West Indies, that on the Orthoptera of Cuba by Ignacio Bolivar with 145 species, are the only important papers we have.

It may be inferred from these facts, however, that each of the other islands of the group will furnish undescribed genera and species of closely related forms — those that have become so differentiated by long isolation under changed environment. Why not institute a systematic campaign for learning what all of these nearby islands contain in the way of insect life? This should by rights be done by American entomologists.

The arrangement of the non-saltatorial families in this paper is after Kirby's Synonymic Catalogue of the Orthoptera, Vol. I.

Order DERMAPTERA.

Although the members of this order are not Orthoptera as now recognized, they have been so long considered as such that it is thought best to include them here. At least five species are at hand, four of which seem to be new. They are the following :

1. Labia trinitatis, new species.

A small, dark brown insect with a plain black head, pronotum, tegmina and wing sheaths, in which the disk of the abdomen above the forceps are reddish mahogany-colored. Body provided with a few stout bristles at sides of abdominal segments. Antennæ 10–13 jointed, dusky at base but becoming paler apically — the last two or three being obscure testaceous. Legs of normal length, the femora moderately stout ; the latter dull black except apically where they are testaceous, the tibiæ, except on basal half where they are infuscated and tarsi pale testaceous. Head wider than the pronotum, the clypeus, labium and other mouthparts dirty testaceous. Pronotum about as long as wide, the sides parallel, hind margin broadly rounded, the front edge a little angulate, the shoulders each provided with a conspicuous anteriorly projecting bristle ; the disk forward moderately convex and showing a well-defined longitudinal sulcus. Tegmina a little more than twice as long as broad, their apices gently obliquely truncate, the surface smooth and shining. Wing-sheaths fully developed. Abdomen broadened in the middle, segments 2 and 3 showing slight traces of lateral folds ; the last dorsal segment of male abdomen a little narrowed behind, its posterior edge straight and possessing a slight protuberance above the base of each prong of the forceps. The latter short, moderately robust at base where they are widely separated, their inner edge provided with a carina which ends in a small tooth, parallel for about one third their length, beyond this tooth tapering and evenly curved so that the tips cross on outer fourth. The arms of the female forceps also quite robust at base, but tapering quite rapidly, the inner edges touching and the apices gently crossing.

Length of body, ♂, 5.5 mm., ♀, 5.25 mm., of forceps, ♂, 1.1 mm., ♀, .85 mm.

Habitat. — Island of Trinidad, H. D. Chipman, collector, 1 ♂ and 1 ♀.

2. **Labia insularis, new species.**

A medium-sized, almost naked, smooth-bodied insect with from 14- to 16-jointed antennæ, and in which the wing-sheaths are largely testaceous in the center basally. Basal joint of antennæ and legs pale testaceous, the latter somewhat infuscated on the femora mesially and tibiæ basally. The labrum, together with labial and maxillary palpi, also somewhat pale-colored. Head dull black, the eyes large and prominent, rather coarsely granulate. Pronotum about as broad as long, the sides gently bowed; dull black, becoming brownish on the thinner lateral edges. Tegmina brown with a small testaceous longitudinal shoulder streak, about twice as long as their greatest width, their apices obliquely docked, the truncation gently concave. Wing-sheaths moderately large, reaching to the middle of third abdominal segment. Abdomen with the surface polished and only delicately punctate, the sides convex, broadest about the middle; the disk above dark mahogany brown, the base, apex and sides much darker, nearly or quite black; lower side testaceous basally becoming ferruginous apically. Forceps moderately stout, nearly straight and provided internally basally with a short flattened plate or projection the edges of which touch, beyond irregularly crenulate, scarcely toothed, the apices gently crossed.

Length of body ♀ (?), 8.5 mm; of forceps, 1.85 mm.

Habitat. — Island of Trinidad, West Indies, H. D. Chipman, collector.

In this insect the last dorsal segment of the abdomen is a trifle more than three and one half times as broad as long, coarsely punctulate, the sides gently rounded and converging posteriorly, the hind edge straight; middle of posterior portion lowered and provided with a central shallow depression.

3. **Labia modesta, new species.**

Very similar in general appearance to the preceding but differing from it in its somewhat smaller size, slightly more hairy body, the fewer antennal joints (13–14), the absence of the testaceous shoulder stripes on the tegmina, the smaller basal light spots of wing sheaths which in the present form are lateral rather than central — there being no border of the dark color externally as in *L. insularis*. Here the thin lateral edges of the gradually broadening pronotum are transparent. The disk of dorsal segments 4, 5, and 6 are brownish testaceous. Lower side along with legs pale testaceous, the latter, with the femora above strongly infuscated. Last dorsal segment smooth, about twice as wide as long, narrowing behind, the middle triangularly depressed between centers of bases of the two prongs of forceps and provided with a series of small, round, wart-like raised points. Forceps with their inner edges not laminate, not quite touching basally, evenly tapering, carinate above, crenulate on inner edge, the points crossing.

Length of body, ♂, 7 mm.; of forceps, 1.6 mm.

Habitat. — Island of Trinidad, West Indies, H. D. Chipman, collector, a single specimen.

4. Labia pictipennis, new species.

A large rather robust black species with ferruginous head, small black eyes and yellowish testaceous legs in which the tegmina and wing-sheaths are each provided with a large conspicuous spot of a bright yellowish orange color. The pronotum also more or less strongly bordered at sides with yellowish testaceous, sometimes its disk anteriorly likewise ferrugineo-testaceous. Antennæ 13- to 15-jointed, the two basal and one half of the third of the same color as head, the third and fourth joints from the apex are pale testaceous, remaining joints black. Whole insect sparsely clothed with rather long stiff hairs or bristles which are especially noticeable on the hind edges of femora and abdominal segments. Pronotum small, narrower than the head, about as long as wide, a little narrowed behind, the latter margin rounded ; anterior half of disk roundly convex, with a well-marked longitudinal sulcus which becomes very pronounced on the depressed posterior half where it seems to issue from between two diverging, backward pointing carinæ. Tegmina about two and one half times as long as broad, their apices slightly obliquely docked ; wing sheaths reaching a little beyond the apex of the second abdominal segment. Abdomen somewhat broadening at middle ; last dorsal segment about twice as wide as long, a little narrowing behind, and provided above with faint longitudinal grooves or scratches. Anal forceps simple, short, heavy, triangular, their inner edges not quite touching at base, bluntly toothed or crenulate within, the tips crossing.

Length of body, ♂, 16–17 mm.; of forceps, 2.55 mm.

Habitat. — Trinidad Island, H. D. Chipman, collector, 2 ♂.

Joints 1 and 2 of tarsi are unusually hairy below.

5. Spongiphora croceipennis var. parallela Westwood.

Forficula parallela Westw., in Guer. Mag. Zoöl., VII, pl. 178 (1837).

Forficula longiforcipata Blanch , in d'Orbigny Voy. Am. Merid., VI, ii, Ins. p. 214, pl. 26, fig. 1 (1837–1843).

Forficesila longissima J. G. Wood, Ins. Abroad, p. 279, fig. 139 (1877).

Spongiphora croceipennis parallela Bormans, Tierr, 11 Lief., p. 56 (1900).

This species is represented by six specimens which were collected by H. D. Chipman. They belong to the variety 1*b*, according to A. de Bormans and H. Krauss (see Thierreich, 11 Lieferung, p. 56).

No doubt several other genera and species of the Forficulidæ are represented on the island.

Order ORTHOPTERA.

Family BLATTIDÆ.

6. Anaplecta sp.

There is a single specimen of this genus at hand that has not yet been determined. It was taken by Chipman at Port of Spain.

7. **Chorisoneura mysteca Sauss.?**

A second small cockroach that was taken at the same place by Mr. Chipman is referred here with some doubt.

8 **Ischnoptera sp.**

A single specimen about the size of, and bearing considerable resemblance to *I. uhleriana* Sauss., was taken near Port of Spain by Chipman.

9. **Phyllodromia notata Brunner ?**

Phyllodromia notata Brunner, Proc. Zoöl. Soc. Lond., 1893, p. 602, pl. 52, figs. 1 *a*, *b*.

There are two specimens from near Port of Spain that appear to belong to Brunner's *P. notata*. They were also collected by Chipman.

10. **Phyllodromia adspersicollis Stål.**

Blatta adspersicollis Stål, Eugenie's Resa, Ins., p. 308 (1858); Sauss., Miss. Mex., Orthopt., p. 35, pl. 1, fig. 22 (1870).

Phyllodromia adspersicollis Brunn., Syst. Blatt., p. 107 (1865).

Blatta nahua Sauss., Rev. Zool., Ser. 2, XX, p. 355 (1868); Sauss. and Zehntn. Biol. Cent. Amer. Orth., I, p. 42, pl. 4, figs. 19–21 (1893).

This species is represented by six specimens, all of which were taken near Port of Spain by H. D. Chipman. It seems to be one of the few species which in time is destined to become widely spread in tropical countries.

11. **Phyllodromia conspersa Brunner.**

Phyllodromia conspersa Brunn., Syst. Blatt., p. 106, No. 24 (1865).

The collections received from Mr. H. D. Chipman contain two specimens of this species. They were collected on the Island of Trinidad.

12. **Phyllodromia sp.**

There are two specimens of a pale species of this genus which are a trifle smaller than the preceding. They were collected by Mr. Chipman and sent to me along with a number of other interesting Orthoptera taken near Port of Spain.

13. **Phyllodromia infuscata, new species.**

Still another and rather slender small species of this genus is represented by a single specimen taken by Chipman near Port of Spain on Trinidad Island. It seems to be new.

Dark piceous, with paler border to the pronotum in front and on the sides, and on the costal margin of the elytra as well. The pronotum is marked on the disk pos-

teriorly by a rather large triangular yellow spot that gives off a narrow forward projecting shoot in its middle. The head is dark, save about the base of antennæ and clypeus, where the color is testaceous. Venter pale, with a dusky vitta on each side of the middle. Cerci heavy, 10-jointed, the basal one testaceous, the rest dark. Length to tip of wings, 10.5 millimeters.

The type is in the writer's collection.

14. Phyllodromia (?) binotata, new species.

A single ♀ (?) specimen from H. D. Chipman is included in this genus with much doubt. It is dark colored and has the femora almost destitute of spines; the tegmina are a little longer than the abdomen and veined similarly to those of *Phyllodromia*. The cerci are rather incrassate, but acuminate, 9- or 10-jointed. The antennæ are coarse and the joints decidedly moniliform in appearance. The characteristic marking is two small pale triangular spots on the disk of the pronotum towards its hind margin.

Length, including wings, 9.5 millimeters.

15. Pseudophyllodromia sp.

Two specimens are placed in this genus, but no attempt has been made to determine the species. These insects are in the collection obtained from Chipman. They were taken near Port of Spain. In color they are dark piceous with pale legs, lateral borders of pronotum and costal margin of tegmina. In size they measure 8 millimeters, including tegmina and wings.

16. Nyctobora mexicana Sauss.

Nyctobora mexicana Sauss., Rev. et. Mag. Zoöl., XIV, p. 227 (1862).
Nyctobora stygia Walk., Cat. Blatt., Brit. Mus., p. 148, No. 9 (1868).

A single female specimen collected on the Island of Trinidad and sent to me by W. E. Broadway, of St. George's, Island of Grenada, is placed here.

17. Phoraspis sp.

There is a single somewhat mutilated specimen of *Phoraspis* before me from Trinidad Island. It was taken by W. E. Broadway, from whom it was obtained along with some other miscellaneous orthopterous insects. This insect is somewhat similar to *P. pantherina*, but differs from it in having the sides of the pronotum and anterior lateral margins of the tegmina testaceous and evenly conspersed with black.

18. Epilampra cribrosa Burmeister?

1 ♂ and 3 ♀♀ from H. D. Chipman, who collected them in the woods near Port of Spain.

19. **Epilampra brevis Brunner?**

There are a like number of a second species from the same locality and person which seem to belong to Brunner's *E. brevis*.

20. **Blatta (Stylopiga) meridionalis, new species.**

A medium-sized species of glossy black color in which both sexes are entirely apterous, not showing even the slightest signs of the aborted lateral tegmina as figured for *insularis*. The distinguishing characteristic of the species, however, is the dirty white palpi, which are very conspicuous in comparison with the otherwise general pitchy black color of the insect.

In size this cockroach is somewhat smaller than *orientalis*. It is also more compactly built and darker colored, while its entire body is smooth and impunctate. The only variation from the general black color, except the palpi as indicated above, are the antennæ on their apical half, the legs on their coxæ, the front edge of the femora, the knees and parts of the tarsi which incline to rufo-piceous. The legs are quite strongly spined. The spines on the posterior edge of the anterior femora both above and below are much smaller than those on the other legs, the number fourteen or fifteen in each row. The middle and hind pairs have this part provided with a series of seven both above and below. The apical dorsal segment or supraanal plate of the ♀ abdomen is triangular with its tip evenly rounded, while the last ventral is prow-shaped and pointed. In the ♂ the upper plate is slightly transverse with rounded lateral edges and a slight longitudinal median furrow which gives to it a somewhat bilobed appearance. The cerci are moderately long and robust in both sexes.

Length of body, ♂, 16, ♀, 23; of pronotum, ♂, 4, ♀, 5.40; greatest width of pronotum ♂, 6, ♀, 7 millimeters.

Habitat. — Island of Trinidad, 1 ♂, 1 ♀ (H. D. Chipman, collector).

The types are in the author's collection.

21. **Periplaneta americana Linneus.**

This cosmopolitan species is represented by several specimens. It was also collected by Mr. Chipman, presumably in Port of Spain.

22. **Periplaneta australasiæ Fabricius.**

Likewise from Port of Spain. Taken by Chipman. Like the preceding a cosmopolitan insect, but more especially confined to the warmer parts that are visited by ocean shipping.

23. **Leucophæa surinamensis Linneus.**

There are also several specimens of the above-named cosmopolitan roach. They come from Mr. Chipman and were taken in the interior of the Island of Trinidad.

24. Panchlora virescens Thunberg.

Blatta virescens Thunb., Mem. Acad. St. Petersb., X, p. 278 (1826); Serv., Ins. Orthoptera, p. 101 (1839).

Blatta (Pachlora) virescens Guer., in Ramon de la Sagra, Hist. Cuba, Ins., p. 344 (1857).

Two female specimens of the genus without the black dots on the elytra are placed here. Collected by H. D. Chipman.

25. Panchlora viridis Burmeister.

Panchlora viridis Burm., Handb. Ent., ii, p. 506 (1838).

Panchlora poeyi Sauss., Rev. et Mag. de Zool., 1862, p. 230; Ib., Mem. Blatt., p. 194 (♂).

A single male from Chipman taken near Port of Spain seems to agree perfectly with the description of *viridis*. It also lacks the dot on the tegmina.

26. Panchlora peruana Sauss.

This, the most abundant as well as widely distributed species of the genus, is represented by a pair. They were also taken by Mr. Chipman in the forests on the Island of Trinidad. It is the insect that is most frequently carried in bunches of bananas to various parts of the United States. One or two of the other species are likewise thus carried.

27. Archimandrita marmorata Stoll?

Blatta marmorata Stoll, Spectres, Blattes, p. 3, pl. 2d, fig. 5 (1813).

Blabera marmorata Sauss., Mem. Mex. Blatt., p. 249 (1864); Brunn., Syst. Blatt., p. 378 (1865).

Archimandrita marmorata Sauss., & Zehntn. Biol. Cent. Amer., I, p. 116 (1894).

A single mature nymph is placed here with some doubt. It certainly does not belong to the next genus. Collected by W. E. Broadway.

28. Blabera stollii Brunner.

Blatta gigantea Stoll, Rep. Spectres, etc., p. 2, Pl. 1*d*, fig. 1 (1813).

Blabera stolii Brunn., Syst. Blatt., p. 374 (1865).

A single specimen of this giant cockroach was sent to me by W. E. Broadway who collected it on the Island of Trinidad.

29 Blabera fusca Brunner.

Blabera fusca Brunn., Syst. Blatt., p. 376 (1865).

A single female specimen from near Port of Spain is placed here. It was collected by H. D. Chipman.

30. **Blabera cubensis Saussure.**

Blabera cubensis Sauss., Rev. et Mag. de Zool., Ser. 2, XVI, p. 347 (1864).
Blabera subspurcata Walk., Cat. Blatt. Brit. Mus., p. 4 (1864).

This species is represented by but a single specimen, a female, that was collected at the same time and place with the preceding by Chipman.

These large blattids are not plentiful although there are numerous forms, many of which are rather widely distributed. They usually come into collections a specimen at a time.

31. **Latindia castanea Brunner.**

Latindia castanea Brunn., Proc. Zool. Soc. Lond., 1893, p. 604.

A single individual from near Port of Spain, H. D. Chipman collector.

Family MANTIDÆ.

32. **Acontista multicolor Saussure.**

Acontista multicolor Sauss., Mitth. Schweiz. Ent. Ges. III, p. 229 (1870).

Two undoubted females and four possible males of this species are before me as I write. They were taken by H. D. Chipman.

33. **Tithrone roseipennis Saussure.**

Acontista roseipennis Sauss., Mitth., Schweiz. Ent. Ges. III, 229 (1870).
Tithrone roseipennis, Sauss. & Zehntn., Vol. I, p. 139 (1894).

Three specimens, 1 ♂ and 2 ♀♀, are at hand. H. D. Chipman, collector.

34. **Liturgousa cayennesis Saussure.**

Two females of this insect are among the material received from H. D. Chipman. They come from the interior of the island.

35. **Mionyx surinamus Saussure.**

Thespis surinama Sauss., Mitth., Schweiz. Ent. Ges. III, p. 70 (1869).
Mionia surinama Stål., Bihang. Svenska Akad., iv, pp. 63, 64 (1877).

One specimen, a male, was taken along with the preceding by Mr. Chipman.

36. **Acanthops sp.**

W. E. Broadway sent me two specimens of an *Acanthops* which he collected on the Island of Trinidad several years ago. They are dead-leaf brown and about the size and form of *A. godmani* Sauss. Their much darker color, however, seems to indicate their distinctness. It is hardly possible that this is an undescribed species.

37. Oxyops rubicunda Stoll.

Mantis rubicunda Stoll, Reps. Spectres, Mantes, p. 73, Pl. 25, fig. 26 (1813).

Stagmatoptera diluta, ♂ (nec ♀), Sauss., Mem. Mex. Mant., p. 87, pl. 1, fig. 6 (1871).

A single specimen, a female, is at hand. It was collected and sent to me from Port of Spain by H. D. Chipman.

38. Parastagmatoptera vitrepennis, new species.

Most closely related to *P. unipuncta* (Burm.) and *P. tessellata* Sauss. et Zehnt., from both of which it differs in its somewhat smaller size, slenderer form (?) and shorter tegmina. The prothorax is almost without the marginal dentation of *unipuncta*, while the tegmina are considerably shorter than the wings. The marginal field of the former is green and opaque on the basal half.

Lower inner apical third of coxæ black. Prothorax, coxæ and femora, together with antennæ and marginal border of folded tegmina and outer portion wings, testaceo ferruginous; the head and tibiæ with a greenish tinge. Greater portion of the tegmina and wings vitreous, very faintly greenish tinged.

Length of body, ♂, 34, of pronotum, 12, width of its dilation, 2.15, length of tegmina, 24, width of tegmina, 6, of the marginal field, 1.4 mm.

Habitat. — A single male, Trinidad, W. I. (H. D. Chipman, Coll.) The type is in the author's collection.

39. Stagmatoptera præcaria Linneus.

Gryllus (*Mantis*) *præcarius* Linn., Syst. Nat. (ed. X), I, p. 426, No. 7 (1758).

Mantis precaria DeGeer, Mem. Ins., III, pp. 406, 407, No. 3, pl. 37, figs. 4, 8, 9 (1773).

And a number of synonyms.

Habitat. — W. E. Broadway has sent me 1 ♂ and 2 ♀ ♀ of this common large South American mantis. It was collected on the Island of Trinidad.

Family PHASMIDÆ.

40. Clonistria linearis Drury?

Mantis linearis Dru., Illustr. Exot. Ent. I, pl. 50, fig. 3 (1773).

Bacteria linearis Gray, Syn. Phasm., p. 17 (1835); Westw. Cat. Phasm. Brit. Mus., p. 24, No. 64 (1859).

(?) *Clonistria linearis* Rehn, Proc. Acad. Nat. Sci. Philad., 1904, p. 60.

Pseudobacteria longiceps Kby., Ann. Nat. Hist. (6), III, p. 503 (1889).

The collections contain a number of immature Phasmids from Trinidad, while only two fully matured specimens are at hand. A male may be the *linearis* of Drury. If so, a female taken at the same time may prove to be its female. It is of a very dark gray-brown

color, rather robust in form, somewhat granulose, and provided with 3 longitudinal carinæ on the dorsum of thorax and abdomen, on the latter the median one is looped or linked so as to appear as a chain, a link to a segment. The head is provided on the occiput, with two fairly prominent short spines or horns between and a little back of the eyes. The legs are a trifle more robust and shorter than those of the male, while its antennæ are also much shorter. Its length is 50 mm.

A number of younger specimens show a great variation in color. Some are green, others testaceous and still others ferruginous.

41. Acanthoclonia histrinus Westwood.

Ceroys histrinus Westw., Cat. Phasm. Brit. Mus., p. 60, No. 156, pl. 1, fig. 5.

A single female specimen by H. D. Chipman on Trinidad.

Family ACRIDIDÆ.

Subfamily TETTIGINÆ.

42. Amorphopus notabilis Serville.

Amorphopus notabilis Serv., Hist. Nat. Ins. Orthopt., p. 757, pl. 13, fig. 2 (1839).

There are two specimens, ♂, and ♀, in the collection made by H. D. Chipman on the Island of Trinidad. One of these was examined by Dr. J. L. Hancock.

43. Amorphopus antennatus Bolivar.

Amorphopus antennatus Bol., Essai des Tettig., p. 77, pl. 11, figs. 19, 19*a–b* (1887).

Of this species the collections contain nine specimens. They were collected by Messrs. Chipman and Broadway. It is the common species of the genus in Central America, the West Indies and northern South America.

44. Tettix gracilis, new species

A small and very slender species in which the median carina of the pronotum is slightly arched just back of its anterior margin, less prominent elsewhere but quite plain throughout. The entire insect is rather finely and sharply granular. Vertex about as wide as the diameter of the prominent eyes, with a strong median carina, but little advanced in front of the eyes; frontal costa broad and very prominent between the antennæ.

Length of body, ♂, 6, of pronotum, 9.5, of hind femora, 4 mm.

Habitat. — Trinidad, West Indies, 2 males. H. D. Chipman.

These specimens were examined by Dr. Hancock and pronounced not typical, but still evidently belonging to the genus *Tettix*.

45. Allotettix chipmani, new species.

A very graceful species with unusually elongated pronotum and wings. Eyes rather prominent, the vertex about as wide as one of the eyes, only a trifle projecting beyond their anterior edge, broadly sulcate and provided with a strong median carina which reaches back nearly to the front edge of the pronotum, antero lateral edges rounded and furnished with prominent carinæ. Face rounded and furnished with prominent carinæ. Face viewed in profile rather oblique, strongly sinuate, the frontal costa between the antennæ profound and deeply sulcate, gently widening below. Antennæ arising just below the eyes, slender. Ocelli located about the middle of inner edge of eyes, of ordinary size. Pronotum narrow, the process greatly attenuate and surpassing the tips of hind femora by their own length; the median carina percurrent, a little prominent in advance of the humeral angles just back of the anterior margin; the latter squarely truncate; disk of pronotum both rugose and finely granulate, the rugæ, particularly in widest portion, inclining to form longitudinal or diagonal carinæ; lower posterior angles rounded. Tegmina normal. Anterior and middle femora not clypeate, about normal, the hind femora a little elongate. First and third joints of hind tarsi subequal.

General color dull black or brown, conspersed with testaceous, much paler beneath. Tarsal joints black-tipped. Wings dusky apically, and with the disk dark purplish pearl color.

Length of body, ♂, 7 mm., ♀, 9 mm.; of pronotum, ♂, 12 mm., ♀, 14–15 mm.; of hind femora, ♂, 5 mm., ♀, 6–6.25 mm.

Habitat. — Island of Trinidad and adjoining portions of British Guiana, H. D. Chipman and R. J. Crew, collectors, many specimens of both sexes (Coll. L. Bruner).

46. Micronotus quadriundulatus Redtenbacher.

Tettix quadriundulatus Redt., Proc. Zool. Soc. Lond., 1892, p. 208, Pl. XVI, fig. 10.

This insect is represented by several specimens of both sexes. H. D. Chipman, collector.

An examination of this material seems to indicate that *quadriundulatus* is either very variable or else there are two or more closely related species found upon the island of Trinidad. In the first examination a smoother form with but three undulations of the pronotum was set aside under the name *Micronotus hancocki.* Another and later examination reveals a third form in which there are five such undulations. To definitely settle this matter a much larger series of specimens is necessary.

Two or three additional forms appear among the excellent collection of these interesting little locusts that were received from Mr. Chipman, but they will be reported on at a later date after they have

been critically studied by Dr. J. L. Hancock, who is making a special study of the subfamily.

47. **Tettigidea trinitatis, new species.**

Characterized by its rather slender form, small size, spicate anterior edge and evenly granulate surface of pronotum above, the long wings and pronotal process, and by the pale lower half of body and anterior and middle legs of male.

Pronotum with the antero-dorsal edge strongly angulate and produced upon the occiput in an acute forward projecting spine that reaches as far as the middle of upper edges of the rather large and prominent eyes. Vertex rather narrow, a little more than half the diameter of one of the eyes, projecting slightly in advance of them. Frontal costa narrow, not prominent, deeply sulcate. Antennæ moderately long, pale basally in the males, more or less annulate in the females. Face not greatly oblique. Tegmina narrow, the lower apical edge broadly rounded, the upper apical edge angulate, crossed just before the apex by an oblique narrow pale patch. Hind femora robust in the female, usually provided with a median broad pale band. General color varying from pale to obscure brown, the legs and abdomen of the female more or less conspersed and banded with testaceous. Head of male below the base of antennæ and eyes uniformly dirty white; lower lateral edges of pronotum, all of under side, front and middle legs, base of hind femora, tips of hind tibiæ, the tarsi and most of abdomen also of this color.

Length of body, ♂, 6.75–7 mm., ♀, 9 mm.; of pronotum, ♂, 8 mm., ♀, 9.5 mm.; of hind femora, ♂, 4.60–4.75, ♀, 5.5–6 mm.

Habitat. — 2 ♂ and 6 ♀, Trinidad Island, H. D. Chipman, collector (Coll. L. Bruner).

48. **Tettigidea imperfecta, new species.**

A small dark-colored, slender-bodied insect with greatly abbreviated wings and small narrow apically light blotched tegmina, in which the process of pronotum scarcely reaches the tip of the abdomen. Very finely granulate and without the short lateral longitudinal ridges so commonly met with on the disk of the pronotum in various species of the genus; median carina prominent throughout, the disk anteriorly gently tectate; antero-dorsal edge decidedly angulate but not cuspidate in the single ♀ now before the writer, though a ♂ nymph of what is apparently the same species has the anteriorly projecting spine strongly developed. Eyes of moderate size; width of vertex a trifle more than one half of the longest diameter of eyes, slightly advanced in front, broadly and shallowly sulcate and without a median carina save at the extreme anterior edge. Face somewhat oblique and sinuate when viewed from the side; frontal costa quite prominent between the antennæ, sulcate, its greatest width slightly more than that of basal antennal joint. Posterior femora robust and uncommonly smooth even for the genus. Valves of the ovipositor short and slender.

General color above uniform dark brown, almost black, the lower side, together with legs, varied with dirty testaceous; the anterior and middle tibiæ annulate with black — all the feet black-tipped.

Length of body, ♀, 9 mm.; of pronotum, 8 mm.; of hind femora, 5.5 mm.

Habitat. — 1 ♀ and perhaps also a ♂ nymph, Island of Trinidad, West Indies, collected by H. D. Chipman (Coll. L. Bruner.)

49 Paurotarsus rugosus, new species.

Rather robust and with the surface of pronotum and head above more than commonly rugose, the rugæ on disk of former appearing as numerous blunt longitudinal ridges of varying length. The sexes not greatly unequal in size.

Head short and broad; eyes rather small and separated above by a space a little wider than their greatest diameter; vertex broadly convex, very rough, notched laterally at middle of eyes, considerably advanced in front, provided in the middle with a prominent carina, the antero-lateral edges rounded and provided with well-marked carinæ, which, however, do not reach the middle in front. Frontal costa very prominent and broad, the lateral edges heavy and rather profoundly divergent below, sulcate from the extreme vertex. Lateral facial carinæ strong, arcuate, extending from the base of the antennæ to lateral edges of base of clypeus. Lateral ocelli very prominent, situated above the middle of inner edges of eyes and against the sides of frontal costa. Antennæ filiform, 18- or 19-jointed, about reaching the base of tegmina, situated a trifle above a line drawn from the lower edge of eyes, the basal joint rather large. Posterior lateral angle of pronotum not at all produced, the lower and posterior edges meeting in a right-angle. Antero-dorsal process of pronotum not advanced upon the occiput; in both sexes extending slightly beyond the tip of the hind femora, the latter slightly surpassing the apex of abdomen; tip of male abdomen long and tapering, apex of last ventral segment rather deeply notched; valves of ovipositor long and wedge-shaped, rather strongly serrate. Hind femora large and course, somewhat longer in proportion to the size of the insect than usual in members of the Tettiginæ.

General color dull brownish black, more or less varied on pronotum above and on the legs with dirty ferrugineo-testaceous — the venter irregularly mottled with testaceous, the valves of ovipositor pale with darker apex.

Length of body, ♂, 11 mm., ♀, 13 mm.; of pronotum, ♂ 11 mm., ♀, 12.5 mm.; of hind femora, ♂, 6.5 mm., ♀, 7.25 mm.

Habitat.— 1 ♂ and 1 ♀, Island of Trinidad, West Indies, H. D., Chipman, collector (Coll. L. Bruner).

Subfamily EUTRYXALINÆ.

50. Eumastax sp.

A single nymph of a species of *Eumastax* was collected and sent to me by G. E. Tryhane, of St. Anne's. It seems to be most closely related to the *E. plebja* Gerst., but in the absence of mature specimens cannot be definitely determined.

Subfamily TRYXALINÆ.

51. Amblytropidia trinitatis Bruner.

Amblytropidia trinitatis Bruner, Biol. Cent. Amer. Orthopt., II, p. 65 (1904).

This species is represented by seven males and three females collected by Mr. H. D. Chipman near Port of Spain. It also occurs on the main land at Demerara, British Guiana.

52. Orphullela punctata DeGeer.

Acrydium punctatum DeG., Mem. Hist. Ins., III, p. 503, pl. 42, fig. 12 (1773).
Orphula punctata Stal, Recens. Orthopt., I, pp. 106, 107 (1873).
Orphula (*Orphullela*) *punctata* Gig.-Tos, Boll. Mus. Zool. Torino, IX, No. 184, p. 12 (1894).

Several specimens of both sexes. They were taken at various localities on the island by all the collectors.

While the genus contains numerous representatives in North and Middle America, there is but little doubt as to the identity of DeGeer's species.

53. Orphullela chipmani, new species.

A small species of variable color with the lateral carinæ of the pronotum parallel in advance of the hind transverse sulcus, and with unusually narrow tegmina.

Occiput somewhat elongate, the eyes large but not prominent, the fastigium slightly acuminate even in the female, shallowly sulcate; lateral foveolæ small, linear, scarcely sulcate, frontal costa prominent only above, very shallowly sulcate and with the sides gently divergent below. Antennæ slender, filiform, short, in the male only a trifle exceeding, in the female somewhat less than the combined length of head and pronotum together. Pronotum a little expanding behind, the two lobes equal in length, the lateral carinæ parallel in advance of the last or principal sulcus. Tegmina narrow, the discoidal area in the ♀ containing but a single row of cells, just about reaching the apex of abdomen and hind femora in the female, equal to the latter but longer than the former in the male. Hind femora with basal half robust, apical half slender, immaculate.

Color variable, but usually green or testaceous on occiput, disc of pronotum and dorsal field of tegmina. Sides of head, back of eyes, upper half of sides of pronotum and pleuræ, and disk and costal field of tegmina dark fuscous; face, lower portion of cheeks, sides of pronotum, pleuræ, hind femora, abdomen and under side pale (male). In the female the fuscus band back of the eyes is much narrower and confined to the upper edge of the sides of pronotum and the tegmina are much paler and show traces of maculation. The wings are fuliginous or fuscous, darkest apically. Hind femora somewhat obscure on the knees, and the hind tibiæ along with all the tarsi also infuscated.

Length of body, ♂, 12–13, ♀, 18; of pronotum, ♂, 2.2, ♀, 2.9; of tegmina, ♂, 9.5–10, ♀, 12–13; of hind femora, ♂, 7.5 ♀, 9.5 mm.

Habitat. — Interior of Island of Trinidad, several specimens of both sexes. H. D. Chipman, collector.

54. Orphullela insularis, new species.

Specimens of what appear to be a third species of *Orphullela* are among the collections received from both Mr. Chipman and Mr. Tryhane. They are about the size of the preceding from which they differ in their slightly more robust form, the shorter and somewhat flattened antennæ, the smaller eyes, the more obtuse fastigium of the vertex, the gently arcuate lateral carinæ of the pronotum, the slightly broader tegmina and more robust hind femora. In color they vary from a pale brunneo-testaceous to a dull brown. Some female specimens show the usual dusky pronotal and pleural markings, while others are without them. Both the males and the females have the tegmina quite evenly maculate with pale to darker fuscous patches similar to those so characteristic in the considerably larger *O. punctata* DeGeer. The hind femora of the males have prominent traces of a fuscous band across the upper edge, while the lower outer carina is adorned with 4 to 6 elongate fuscous maculations. Anterior and middle tibiæ fasciate with fuscous, the hind tibiæ somewhat infuscate. Sides of basal abdominal segments piceous.

Length of body, ♂, 13.5, ♀, 18; of pronotum, ♂, 2.9, ♀, 3.25; of tegmina, ♂, 12, ♀, 13.5; of hind femora, ♂, 8, ♀, 9.5–10 mm.

Habitat. — Trinidad, West Indies.

This insect will run close to *meridionalis* Bruner, in the synoptic table of the genus as given in the Biologia Centrali Americana, but by comparison with that species shows a number of differences.

Subfamily ACRIDIINÆ.

55. Prionolopha serrata Linnæus.

There are at hand two males and a female of this widely distributed South American locust. They were received from H. D. Chipmann, who collected them on the Island of Trinidad.

56. Tropidacris dux Drury.

One male and two females (H. D. Chipman), a pair (W. E. Broadway), and female (G. E. Tryhane).

For the synonomy of this handsome large locust see Scudder's article entitled "A Study of the Giant Lobe-crested Grasshoppers of South and Central America."

57. Prionacris ? sp.

Mr. G. E. Tryhane sent to me among other interesting Orthoptera taken on the Island of Trinidad a young nymph which seems to belong to the genus *Prionacris*. It is black, marked with dashes of yellow. There are three such markings, which are oblique, on each side of the disk of the pronotum, and the hind femora are thrice banded with the same color.

Group LEPTYSMINI and allies.

From the collections at hand it would appear that at least one half of the American genera of Acridians with the dilated and acute-edged hind tibiæ are represented on the Island of Trinidad. This being true, and because there is likewise a new genus now to be added to the group, a synoptic table of the genera is herewith given:

TABLE FOR THE SEPARATION OF THE AMERICAN GENERA OF LEPTYSMA AND ALLIES.*

* This table is a modification of Giglio-Tos' (Bolletino dei Musei di Zoologia ed Anatomia comparata della R. Universita di Torino, No. 311, XIII, pp. 40–50, 1898).

A. Posterior tibiæ slightly expanding apically, the margins acute.

b. Mesosternal lobes with their inner edges nearly straight and touching for most of their length. Elytra acuminate.

c. Fastigium of the vertex as long as, or longer than, the longest diameter of eyes.

d. Fastigium of the vertex furnished with decided longitudinal grooves or sulci.

e. With but a single profound sulcus .....**Leptysma** Stål.

ee. With four such narrow but well-defined sulci.

Leptysmina G. Tos.

dd. Fastigium of the vertex without definite longitudinal sulci.

Cylindrotettix n. gen.

cc. Fastigium of the vertex shorter than the eyes.....**Arnilia** Stål.

bb. Mesosternal lobes more or less distant. Tegmina subacuminate or rounded at apex.

c. Posterior margin of the pronotum rounded.

d. Tubercle of the prosternum transverse, broad, the apex truncate.

Oxybleptella G. Tos.

dd. Tubercle of the pronotum conical, more or less acute.

e. Body very graceful or slender. The front strongly oblique. Head much exserted, conical. Antennæ distinctly ensiform. Eyes rather elongate, viewed from above strongly convergent, meeting at an acute angle. Pronotum distinctly dilated posteriorly, the lower edge of sides straight, oblique. Tegmina somewhat dilated toward apex.....**Inusia** G. Tos.

ee. Body heavier. The front less oblique. Head only gently exserted, not conical. Antennæ filiform, or a little subensiform. Eyes not at all or but little elongated, when viewed from above slightly convergent, forming an obtuse angle. Pronotum not or but little dilated posteriorly; the lower edge of sides straight on posterior half, emarginate on anterior half. Tegmina narrow towards apex.

f. Pronotum cylindrical, the dorsum straight viewed laterally, the metazona not elevated. Frontal costa below the ocellus and the lateral carinæ of the face subobsolete. Eyes rather oblique, less prominent.....**Stenopola** Stal.

ff. Pronotum gently dilated posteriorly, the dorsum when viewed laterally sinuate, subselliform, the metazona gently elevated, the humeral angles rather distinct. Frontal costa and lateral carinæ of the face distinct. Eyes less oblique and strongly prominent..**Henia** G. Tos.

cc. Posterior margin of the pronotum obtusangulate.

d. Angle of the posterior margin of the pronotum entire, not incised. Tegmina greatly surpassing the hind femora.

e. Frontal costa rather prominent between the antennæ, subdilated. Eyes rather strongly convergent and somewhat remote from the front edge of the pronotum. Tegmina with their apices subacuminate ....**Cornops** Scudd.

ee. Frontal costa less prominent between the antennæ, not dilated. Eyes less convergent, not distant from the front edge of the pronotum. Tegmina with their apices distinctly rounded. **Paracornops** G. Tos.

dd. Angle of the posterior margin of the pronotum greatly incised. Tegmina not surpassing the hind femora.

e. Frontal costa percurrent, sulcate throughout. Fastigium of vertex subhorizontal.....**Mastusia** Stal.

ee. Frontal costa subobsolete below the ocellus, not sulcate. Fastigium declivant..... .....**Tetratænia** Stal.

AA. Posterior tibiæ not or but little expanded apically, the margins rounded. **Copiocera** Burm.

58. Leptysma minima, new species.

Cylindrical, slender, small General color (alcoholic) pale ferrugineo-testaceous, without any signs of the usual paler or darker elongate lateral lines

Head large, considerably longer and a little wider than the front edge of the pronotum. Eyes large, oblique, not prominent, a little longer than that portion of the cheeks below them. The fastigium separated from the very narrow vertex by a rather deep notch, suddenly expanded so as to become even with the outer front edge of the eyes and a little longer than one of them, roundly angulate in front and provided with a broad and rather profound median sulcus. Antennæ as long as the head and pronotum combined, broadly ensiform. Pronotum pinched laterally in the middle, a little broader in front than behind, the surface somewhat punctate, especially on the hind lobe, which is much shorter than the anterior one. Tegmina long, narrow, lanceolate, with comparatively few veins, extending somewhat beyond the apex of the abdomen. Hind femora slender and weak, much shorter than the abdomen. Hind tibiæ with 16 spines in outer row and 25 in inner row.

Length of body, ♀, 29; of head, 6; of pronotum, 3.5; of hind femora, 10; of tegmina 23 mm.

Habitat. — Island of Trinidad, W. E. Broadway, collector (Coll. L. Bruner).

This insect is nearest to *L. gracilis* Bruner, a species that comes from Brazil and which has recently been recognized as distinct from *L. filiformis* Serv. It has been described in the Proceedings of the U. S. National Museum in connection with other forms from South America.

Genus CYLINDROTETTIX new.

Aside from the characters mentioned in the foregoing table a few additional characters should be given as follows: Head long and pointed; the eyes very oblique, not prominent, about as far apart above as the width of the second antennal joint; fastigium equally as long as the eyes, its upper side rounded, its apex as in *Leptysmina*, antennæ strongly ensiform, as long as the head and pronotum together, frontal costa prominent and sulcate above the ocellus to a point slightly in advance of the apex of fastigium where it suddenly narrows to a mere ridge, below the ocellus faint. Pronotum a trifle longer than the occiput, its surface strongly punctulate, all three transverse sulci well-defined, the median carina present but not prominent except on the hind lobe; front and hind margins rounded above, the former with the middle squarely docked. Prosternal spine of moderate size and enlarged apically, gently directed to the rear. Legs weak, slender and short; hind femora reaching but little beyond the basal two thirds of abdomen; hind tibiæ considerably shorter than the femora, with nine or ten weak spines in outer row. Tegmina long and slender, reaching considerably beyond the tip of the abdomen. Valves of the ovipositor rather short and tapering rapidly towards the moderately hooked apices; the upper ones provided above basally with a single prominent black tubercle, the lower pair each with three fairly large tubercles.

59. Cylindrotettix insularis, new species.

General color grass-green with a ferruginous tinge to thorax above and tegmina. The usual greenish-white line beginning at lower posterior edge of eyes and passing back to lower edge of pronotum and across pleuræ to base of hind femora. Face apple-green; antennæ ferruginous, eyes æneous; anterior and middle legs green; lower side pale greenish yellow.

♀. Length of body, 38–42; of antennæ, 14; of fastigium, 3; of pronotum, 5.75; of tegmina, 33–36; of hind femora, 15.5 mm.

Habitat. — 2 ♀♀, Trinidad Island, West Indies, H. D. Chipman, collector (Coll. L. Bruner).

60. Arnilia cylindrodes Stål?

There is a single male specimen of *Arnilia* in the collection from Trinidad which is determined with some doubt as Stål's *Opsomala cylindrodes*. Although it agrees well with a female specimen taken by the writer at Victoria, Brazil, and another from Demerara, British Guiana, a careful comparison of the structure of the last ventral segment of the male abdomen in specimens from Florida, Mexico and South America, shows this to vary much. Our North American

(Southeastern U. S.) specimens are certainly distinct from those coming from South America. These insects will be more carefully examined later and the results published in a special paper now in course of preparation.

61. Inusia chimpani, new species.

Very similar to *I. gracillima* G.-Tos, but differing from it in its somewhat larger size and darker color.

Head, except on the sides back of the eyes, strongly punctate. Eyes prominent, separated above by a very narrow space which is sulcate; the fastigium somewhat ascending, elongate, triangular, shorter than the eyes, rugosely punctate or verruco-se, carinate anteriorly. Face viewed in profile broadly concave, the median costa sulcate and coarsely punctate; lateral carinæ sharp. Antennæ distinctly but not broadly ensiform, nearly as long as the hind femora. Pronotum somewhat dilated on the posterior lobe, punctate, more strongly so on the hind lobe. Lower lateral edges in the female straight, in the male a very little sinuate. Tegmina considerably surpassing both the abdomen and hind femora, the extreme apex subacuminate. Hind femora just reaching (♀) or considerably surpassing (♂) the apex of the abdomen, their genicular lobes somewhat acuminate. Hind tibiæ only gently dilated apically, provided externally with seven and internally with nine spines. Last ventral segment of male abdomen short and rather blunt, the apex entire. Valves of ovipositor short and slender.

General color above dark fusco-ferruginous, below greenish testaceous, separated on the sides by a narrow, deep black band which reaches from the hind edge of the eyes to just above the base of the hind femora. The latter greenish, their apices with a ferruginous tinge and marked on their inner genæ with black; hind tibiæ pale glaucous, infuscated basally. Dorsum of abdomen fuscous. Antennæ dark ferruginous. Wings infuscated.

Length of body, ♂, 20, ♀, 25; of pronotum, ♂, 3.9, ♀, 4.5; of tegmina, ♂, 20, ♀, 24; of hind femora, ♂, 11.5, ♀, 14 mm.

Habitat. — Island of Trinidad, six males and one female, H. D. Chipman, collector, 1 ♂, W. E. Broadway (Coll. L. Bruner).

This insect occurs in British Guiana as well. Still another species of the genus is found in portions of Mexico and Central America.

62. Stenopola limbatipennis Stål?

Three males and one female from the interior of the island are referred here with some doubt. They were collected by H. D. Chipman.

63. Cornops bivittatum Scudder?

Another species of these aquatic or subaquatic Acridians, which was taken by Mr. Chipman is represented by three specimens 1 ♂ and 2 ♀♀. It is doubtfully referred to Scudder's *Cornops bivittatum* until it can be studied more carefully.

64. Copiocera erythrogastra Perty.

Xiphocera erythrogastra Perty., Delect. Anim. Artic., p. 122, pl. 24, fig. 2 (1830).
Copiocera erythrogastra Brum., Handb. Ent., II, p. 612 (1838).
?Gryllus euceros Marschall, Ann. Wien. Mus., 1836, p. 206, pl. 18, fig. 8 (1836).

A single female of this species was sent to me by Mr. H. D Chipman, who took it on Trinidad.

65. Vilerna æneo-oculata DeGeer.

Acridium æneo-oculatum DeG., Mem. III, p. 502, pl. 42, fig 11 (1773).
Vilerna æneo-oculata Stål, Recens. Orthopt., I, p. 71 (1873).
Acridium sanguinipes Serv., Hist. Orthopt., p. 670 (1839).

A number of specimens of both sexes taken by H. D. Chipman, on Trinidad. I also have specimens from British Guiana.

66. Sitalces trinitatis, new species.

Rather above the medium in size, a little robust. Sides of head, lower edges of pronotum and pleura to base of middle legs marked with a white line. The male with a broad pale dorsal band and green legs. The female without the pale dorsal band, the legs ferrugineo-testaceous, heavily conspersed with fuscous. Hind tibiæ deep glaucous.

Head a little wider than the front edge of the pronotum, eyes large and prominent, æneous; vertex as broad as the first (♀) or the second (♂) antennal joint, the fastigium slightly depressed, blunt; lateral foveolæ subquadrate, about the size and just in front of the ocelli; frontal costa prominent above, of nearly equal width, continuous and gently sulcate to the clypeus, coarsely punctate above the sulcus. Pronotum without lateral carinæ, coarsely punctate, a little expanding on the posterior lobe which is only half as long as the anterior one, the transverse sulci rather profound, anterior edge truncate, the posterior edge of disk a little emarginate, lower edges strongly sinuose. Tegmina spatulate, long and slender, quite (♂) or nearly (♀) reaching the hind margin of the first abdominal segment. Hind femora comparatively robust, reaching the apex of the abdomen in the female, or surpassing it in the male by the length of the knees. Prosternal spine broad at base, the apex acuminate. Hind tibiæ 8-spined in outer row. Legs and apex of abdomen hirsute.

Head of male dirty white except a triangular patch on the occiput, sides of head back of eyes, a little patch below each antenna and the lower margin of cheeks and labrum which are deep brown or black. In the female the head is dark ferruginous varied with fuscous save on the cheeks below where it is much paler. Palpi white. Pronotum of the male deep chocolate brown except the pale dorsal stripe and lower edges, becoming black immediately where joining the pale portions; meso- and metathorax similarly colored as is also the first abdominal segment; segments 2–4 with broad lateral black patches. Sides of metathorax with a narrow oblique white line. Hind femora in male pale olive green, palest inside and below, the apical lunules alone black or piceous; in the female brownish testaceous with an oblique fuscous band on outer face of basal half and some dusky marks along the carinæ, inner face largely black as are also the apical lunules. Sides of abdominal segments 2 to 4 less broadly black than in the males.

Length of body, ♂, 15, ♀, 18; of pronotum, ♂, 3.3, ♀, 3.85; of tegmina, ♂, 2.85, ♀, 3; of hind femora, ♂, 9, ♀, 10.5 mm.

Habitat. — Island of Trinidad, a single pair in coitu, taken by G. E. Tryhane, of St. Anne's (Coll. L. Bruner).

67. Schistocerca columbina Thunberg.

Gryllus columbinus Thunb, Mem. Acad. St. Pétersb., IX, p. 399, 425 (1824).
Acridium (*Schistocerca*) *columbinum* Stal, Recens. Orthopt., I, p. 67 (1873).
Schistocerca columbina Brunn.-Redt., Proc. Zool. Soc. Lond., 1892, p. 210.

Although no specimens of this insect are at hand in the material before me it is known to occur on the Island of Trinidad, as well as on the mainland and most of the West Indian Islands. It is smaller than *S. simulatrix* Walker, to which it bears some resemblance.

68. Schistocerca simulatrix Walker.

Cyrtacanthacris simulatrix Walk., Cat. Derm. Salt. Brit. Mus., IV, p. 610 (1870).

Schistocerca simulatrix Scudd., Proc. Amer. Acad. Arts. Sciences, XXXIV, p. 454 (1899).

There are three specimens of what seems to be Walker's *simulatrix* at hand. They were collected by H. D. Chipman.

69. Schistocerca pallens Thunberg.

Gryllus pallens Thunb., Mem. Acad. St. Pétersb., V, p. 237 (1815).
Acridium (*Schistocerca*) *pallens* Brunn.-Redt., Proc. Zool. Soc. Lond., 1892, p. 210.

This last locust is widely distributed over tropical America, and while no specimens are contained in the collections at hand from Trinidad, it is known to occur on that island.

70. Schistocerca americana Drury.

There are two specimens, 1 ♂ and 1 ♀, at hand from Trinidad. They were received from W. E. Broadway.

The synonomy of this species can be ascertained by referring to Scudder's paper entitled "The Genus Schistocerca."

71. Osmilia cœlestis Burmeister.

Acridium cœlestre Burm., Handb. Ent., II, p. 634 (1838).
Osmilia cœlestis Brunn., Proc. Zool. Soc. Lond., 1893, p. 606.

This insect is represented by a rather large number of specimens of both sexes. They were taken by both H. D. Chipman and G. E. Tryhane. It also occurs on the Island of Grenada, as well as in British Guiana and other parts of tropical South America.

Just how it differs from *Gryllus violaceus* of Thunberg I cannot say, not having had the time to examine into the matter carefully.

Family LOCUSTIDÆ.

72. Anaulacomera antillarum Brunner.

Anaulacomera antillarum Brunn., Proc. Zool. Soc. Lond., 189 , p. 607.

A single ♀ of this species is before me from Trinidad It was collected by H. D. Chipman.

73. Anaulacomera furcata Brunner.

Anaulacomera furcata Brunn., Monog. Phaneropt., p. 287 (1878).

One specimen, a female, was sent to me by Mr. Chipman, who collected it on the Island of Trinidad.

75. Anaulacomera laticauda Brunner?

Anaulacomera laticauda Brunn., Monog. Phaneropt., p. 292 (1878).

Still another species of the genus is represented by a single male and female. They seem to belong to *A. laticauda*, but do not quite agree with Brunner's description. As it is a more or less variable insect, I am inclined to place it here rather than with *lativertex*, from which it differs also. It was collected by H. D. Chipman.

76. Ctenophlebia zetterstedti Stål

Phylloptera zetterstedti Stal, Orthopt. Freg. Eugene, Resa, p. 322 (1860).
Ctenophlebia zetterstedti, Stål, Recens Orthopt., 2, p. 37.

Two males of this insect were received from Chipman, who collected them in the interior of the Island of Trinidad.

77. Plagioptera bicordata Serville.

Locusta bicordata Serv., Ency. Meth., X, p. 143 (1825).
Pycnopalpa bicordata Serv , Hist. Orthopt., p. 408 (1838).
Plagioptera bicordata Brunn., Monog. Phaneropt., p. 323, pl. VII, fig. 93 (1878).

Only a single female of this oddly marked katydid is at hand. It was captured and sent to me by Mr. H. D. Chipman. He took it in Trinidad.

78. Microcentrum angustatum Brunner?

Microcentrum angustatum Brunn., Monogr. Phaneropt., p. 335 (1878).

A single male is placed here. It was taken by Chipman on Trinidad Island.

79. **Microcentrum lanceolatum Burmeister.**

Phylloptera lanceolata Burm., Handb. Ent., II, p. 692 (1839).

Microcentrum lanceolatum Brunn., Monog. Phaneropt., p. 335, pl. VII, fig. 97 (1878).

Phylloptera laurifolia de Haan, Bijdr., p. 197.

Phylloptera salviafolia Sauss., Orthopt., Nov. Amer., p. 8.

Two females collected by Chipman are determined as belonging to this species.

80. **Philophyllia guttulata Stål.**

Philophyllia guttulata Stal., Ofv. Vet. Akad. Forhandb., 30, 4, p. 40 (1873); Brunn., Monogr. Phaneropt., p. 350, fig. 102 (1878).

Locusta laurifolia Thunb., Mem. Acad. St. Pétersb., V, p. 281 (1815).

The collections contain a male from Chipman and a female from W. E. Broadway.

81. **Philophyllia latior Brunner.**

Philophyllia latior Brunn., Monogr. Phaneropt., p. 551 (1878).

A single female of this second species of the genus is at hand, H. D. Chipman, collector.

82. **Stilpnochlora marginella Serville.**

Phylloptera marginella Serv., Hist. Ins. Orthopt., p. 405 (1839).

Stilpnochlora marginella Stal, Recens Orthopt., 2, p. 44.

Phylloptera thoracica Burm., Handb. Ent. II, p. 693 (1838).

Microcentrum thoracicum Scudd., Bost. Journ. Nat. Hist., VIII, p. 447.

Phylloptera couloniana Sauss., Rev. et Mag. Zool. (?), XIII, p. 128 (♀) (1861).

A male specimen of this common large katydid was sent to me by W. E. Broadway who collected it on the Island of Trinidad.

83. **Peucestes coronatus Stål.**

Peucestes coronatus Stal, Recens Orthopt., 2, p. 45; Brunner, Monogr. Phaneropt. p. 366 (1878); Sauss. et Pict. Biol. Cent. Amer., I, p. 307, pl. XVIII, fig. 1, ♀ (1898).

Two beautiful specimens, both males, were taken by H. D. Chipman.

Subfamily PSEUDOPHYLLINÆ.

84. **Brisilis chipmani, new species.**

General color griseous varied with fuscous. About the size of *B. tenebrosa*, but differing from that species in color and by having the hind wings tessellate instead of unicolorous.

Front piceous bordered with black. Inner basal half of mandibles also black. Sides and disk of pronotum more or less varied with fuscous, the hind lobe unitubercu-

late on each side of disk in front. Tegmina having a sort of maculate appearance due to the fuscous background and the pale testaceous veins, nervures and veinlets, the latter of which are drawn together in clusters leaving darker spots without them. Spines of legs compressed or flattened, hairy and more or less curved apically; 3–5 minute ones on the inner side of anterior, 4 larger on outer side of intermediate, and 9 on outer carina of posterior femora; those on hind tibiæ above strong, inside 12 and longer, outside 10 and weaker. Hind femora with a dash of black internally near the base. Ovipositor serrato-crenulate on upper edge, near the apex with three transverse rugæ and the same number of round tubercles. Subgenital plate triangulate with the apex rather acutely and deeply emarginate. Pro-, meso-, and metasternum together with inner side of middle and hind femora, and the middle tibiæ shining black. Ovipositor piceous, inclining to black apically. Antennæ broadly annulate with pale and dusky.

Length of body, ♂, 35, ♀, 40–42; of pronotum, ♂, 8.25, ♀, 10.15; of tegmina, ♂, 4.5, ♀, 53–57; of anterior femora, ♂, 13, ♀, 15; of hind femora, ♂, 26, ♀, 31–34; of ovipositor, 27–29 mm.

Habitat. — Island of Trinidad, H. D. Chipman, collector, 2 ♂, 1 ♀, W. E. Broadway.

85. Platyphyllum (?) modestum, new species.

Rather below the medium in size, testaceous varied with small fuscous streaks along the veins of tegmina.

Front strongly oblique, testaceous. Pronotum rugose, the transverse sulci deep. Tegmina rough, testaceous varied with a few dark streaks along the veins. Meso- and metasternum unicolorous, dark testaceous. Wings a little infuscated, not tessellate. Legs shortly pilose. Anterior femora a little compressed and arcuate at base, above carinate on apical third, 5-spined below on anterior margin; middle pair 4-spined; anterior and middle tibiæ without spines above; hind femora 7- or 8-spined. Subgenital plate triangular, not notched. Ovipositor of moderate size, nearly straight, the disk towards the apex provided with two or three transverse rugæ, pale at base, piceous at apex.

Length of body, ♀, 29, of pronotum, 6.75, of tegmina, 28, width of tegmina, 7, length of anterior femora, 9, of hind femora, 17, of ovipositor, 1.4 mm.

Habitat. — Island of Trinidad, H. D. Chipman, collector. A single female specimen.

This insect does not agree very well with the diagnosis of the genus *Platyphyllum*, but insisted on running there when going over the synoptic table of genera in Brunner's Monograph of the Pseudophyllidæ.

86. Meroncidius atrispinosus, new species.

A little above the medium in size, anterior and middle femora provided with four black spines; hind femora 8-spined, these likewise black.

Testaceous. Antennæ unicolorous, testaceous. Pronotum unicolorous, rather

coarsely granulose, very faintly tuberculate in front, the transverse sulci rather profound, especially the posterior one; lateral lobes with the lower edge very strongly bordered. Tegmina surpassing the tips of hind femora and nearly reaching the apex of the ovipositor, their posterior edge faintly brownish piceous, otherwise testaceous. Wings ample, infumate, the cross-veins fuscous. Ovipositor not unusually heavy or long, its apical third tapering, the apex slender and gently upcurved, black, the basal part testaceous. Last ventral segment or subgenital plate broadly bilobed, the middle deeply emarginate, the apex of the lobes truncate. Disk of ovipositor without any distinct rugæ.

Length of body, ♀, 42, of pronotum, 9, of tegmina, 48, width of tegmina, 11, length of anterior femora, 14, of hind femora, 30 mm.

Habitat. — Island of Trinidad, 1 ♀, W. E. Broadway, collector.

There is before me a second ♀ specimen taken by the same person, which lacks the spines on the anterior femora as well as all traces of the auditory apparatus. Otherwise, the two are the same in every respect. It is possible that this second insect met with an accident very early in its life which resulted in the removal of auditory apparatus and spines. Not only the spines on the legs but a space about their base is likewise black.

87. Bliastes insularis, new species.

Size medium or small. General color pale testaceous. Occiput provided with a large triangular black patch, the apex of which is directed anteriorly; the fastigium and down middle of face to ocellus shiny black; base of the clypeus and lower face, together with the labrum, black. Antennæ pale testaceous throughout. Pronotum granulose, the posterior lobe shortest and having the lateral angles and hind margin blackish; last transverse sulcus back of the middle, quite profound. Tegmina rather narrow, their apex rounded, all the veins and veinlets pale testaceous, near the base with a faint greenish tinge, the background pale brown giving these members a slightly speckled appearance where the veinlets are missing or further apart than usual. Wings likewise pale, a very little infuscated apically. Anterior femora 4-spined; intermediate 3-spined; hind pair with 5–7 pale-colored ones that are black-tipped. Genicular lobes of hind femora both internally and externally rounded. Anterior and middle tibiæ above without spines, the former somewhat fuscous on upper side save at auditory apparatus which is testaceous, giving to it a banded appearance. Ovipositor gently curved, dark piceous, the base and a longitudinal median line testaceous.

Length of body, ♀, 34; of pronotum, 6; of tegmina, 36; of hind femora, 18 mm.

Habitat. — Island of Trinidad, West Indies, January, two females, H. D. Chipman, collector.

88. Diophanes perspicillatus Stoll.

Perspicillata Stoll, Rept. Spect., etc., pl. VIII, a, figs. 23, 24 (1787).

Diophanes perspicillatus Brunn., Monog. Pseudophyll., p. 242, fig 109 (1895).
Locusta salvifolium Licht, Trans. Linn. Soc. Lond., IV, p. 51.
Platyphyllum salvifolium Brulle, Hist. Nat. Ins., X, p. 139.
Diophanes rosaceus Stål, Obs. Orthopt., I, p. 39 (1875).

W. E. Broadway sent me a single female of this beautiful insect with the statement that it was captured on the Island of Trinidad.

Subfamily CONOCEPHALINÆ.

89. Exocephala viridis Redtenbacher.

Exocephala viridis Redt., Monog. Conocephalidæ, p. 347, 33 (1891).

A single female specimen of this species was collected on Trinidad Island and sent to the writer by H. D. Chipman.

90. Conocephalus guttatus Serville.

Conocephalus guttatus Serv., Hist. Ins. Orthopt., p. 518 (1839).
Conocephalus guttatus Redt., Monog. Conocephal., p. 78, 392, fig. 33 (1891).
? Gryllus obtusus Stoll., Spectres, etc., pl. XVIII, b, fig. 64 (1815).

This species is represented by three females (H. D. Chipman, collector).

91. Conocephalus pichinchæ Bolivar.

Conocephalus pichinchæ Bol., Artropods Viaje al Pacif., p. 100 (1884); Redt., Monog. Conocephal, p. 78, 392, 1891.

One male (H. D. Chipman).

92. Conocephalus maxilosus Fabricius.

Locusta maxillosa Fabr., Ent. Syst., II, p. 37 (1794).
Conocephalus maxillosus Serv., Hist. Ins. Orthopt., p. 520 (1839).

There are two specimens of this species before me. One, a male, was collected by H. D. Chipman, and the other, a female, was received from W. E. Br adway.

93. Conocephalus frater Redtenbacher.

Conocephalus frater Redt., Monog. Conocephal., p. 85, 399, 1891.

Only a single male of this species is at hand. It comes from Mr. Chipman, who took it on Trinidad Island.

94. Conocephalus nigrolimbatus Redtenbacher.

Conocephalus nigrolimbatus Redt., Monog. Conocephal., p. 87, 401, 1891.

This is the fifth *Conocephalus* at hand from Trinidad. It is a male specimen from Mr. Chipman.

95. Xiphidium propinquum Redtenbacher.

Xiphidium propinquum Redt., Monog. Conocephal., p. 208, 522 (1891).

There are two females of a species of *Xiphidium* at hand which are determined as above. They were received from Mr. G. E. Tryhane, of St. Anne's, Trinidad.

96. Thysdrus virens Thunberg.

Thysdrus virens Thunb., Mem. Acad. St. Pétersb., V, p. 274 (1815); Redt., Monog. Conocephal., p. 224, 538 (1891).

Phlugis chrysopa Bol., Orthopt. Cuba, p. 37 (1888).

Four female specimens from H. D. Chipman and one from Mr. Tryhane represent this widely distributed species.

97. Thysdrus mantispa Bolivar.

Phlugis mantispa Bol., Orthopt. Cuba, p. 39 (1888).

Only a single specimen of this insect is at hand. It comes from H. D. Chipman who took it on the Island of Trinidad.

Family GRYLLIDÆ.

Subfamily GRYLLOTALPINÆ.

98. Gryllotalpa hexadactyla Perty.

Gryllotalpa hexadactyla Perty, Del. Anim. Artic. Brasil, p. 119, pl. 23, fig. 9 (1830).

This widely distributed mole cricket of the tropics was taken by Chipman. One specimen is before me.

99. Scapteriscus didactylus Latreille

Gryllotalpa didactyla Latr., Hist. Nat. Crust. et Ins., XII, p. 122 (1802).

Scapteriscus didactylus Scudd., Mem. Peabody Acad. Sci., I, p. 10, pl. 1, figs. 1, 14 (1869).

This second mole cricket was collected by both Broadway and Chipman. A number of specimens are in the collections which form the bases for this report. This insect is a plague in some of the sugar cane fields of tropical America.

Subfamily TRIDACTYLINÆ.

100. Tridactylus (Heteropus) histrio Saussure.

Tridactylus (*Heteropus*) *histrio* Sauss., Biol. Cent. Amer. Orthopt., I, p. 207 (1896).

There are several specimens of this little cricket before me. They were collected by H. D. Chipman on the Island of Trinidad.

101. Rhipipteryx rivularia Saussure.

Rhipipteryx rivularia Sauss., Biol. Cent. Amer. Orthopt., I, p. 212, pl. XI, fig. 20 (1896).

Seventeen individuals represent this really pretty little insect. They come from Chipman and Tryhane. No doubt several other representatives of the subfamily are to be found on the island.

Subfamily GRYLLINÆ.

102. Nemobius trinitatis Scudder.

Nemobius trinitatis Scudd., Journ. N. Y. Ent. Soc., IV, p. 104 (1896).

Mr. Chipman also sent a single female of this species. It agrees with Scudder's description in every respect.

103. Anurogryllus muticus DeGeer.

Gryllus muticus DeG., Mem. Ins., III, p. 520, pl. 43, fig. 2 (♀).

Gryllodes muticus Sauss., Miss. Scient. Mex., Orthopt., p. 411, 1 (♂, ♀), pl. 7, fig. 9 (♂).

I find a male specimen among a small collection of pinned insects which was recently received from W. E. Broadway. He collected it on the Island of Trinidad.

104. Gryllus assimilis Fabricius.

Gryllus assimilis Fabr., Syst. Ent., p. 280 (1775).

Gryllus assimilis Sauss., Miss. Mex., Orthopt., p. 396, pl. 8, figs. 27–29 (1870).

Gryllus verticalis Serv., Hist. Orthop., p. 343 (♀) (1839).

Gryllus aztecus Sauss., Rev. et Mag Zool., XI, p. 316 (1859).

Gryllus cubensis Sauss., Rev. et Mag. Zool., XI, p. 316 (1859).

These names, together with a number of others used by Walker and some of the different writers on Orthoptera, constitute the synonymy of the present species.

Only a single female specimen collected by Mr. Chipman is at hand, from the Island of Trinidad.

105. Miogryllus pusillus Burmeister.

Gryllus pusillus Burm., Handb. Ent., II, p. 733 (1838); Sauss., Mel. Orthopt., 5e Fasc., p. 362, pl. XI, fig. 7.

Gryllodes pusillus Sauss., Miss. Scient Mex., Orthopt., p. 416, pl. 7, fig. 6 (♀).

Miogryllus pusillus Sauss., Biol. Cent. Amer. Orthopt., I, p. 227.

This is still another South American cricket that has found its way to the Island of Trinidad. It is represented by a single male that was obtained by Mr. Chipman who sent me about all of the good things.

Subfamily MYRMECOPHYLINÆ.

106. Ectatoderus insularis, new species.

The present species is most nearly related to *E. alatus* Sauss., a Brazilian insect, from which it differs in being considerably larger, in lacking the pale border to the

posterior edges of the pronotum and abdominal segments and in having the disk of the pronotum ferruginous instead of brownish testaceous. The pronotum is broadly rounded behind and projects beyond the pronotum about one half as far as their extreme width ; the tegmina are testaceous, and have their sides and apex broadly bordered with fuscous ; the speculum is triangular.

General color of head, legs and wings testaceous, more or less varied with pale brown ; pronotum ferruginous, abdomen fuscous inclining to black apically. The entire insect is sparsely squamulose and hirsute, the legs especially are provided with a number of long bristle-like hairs.

Length of body, ♂, 10.5 ; of pronotum, 3.8 ; of tegmina beyond the pronotum, 2 ; of hind femora, 6.25 mm.

Habitat. — A single male collected on the Island of Trinidad by H. D. Chipman. (Coll. L. Bruner.)

This specimen is more or less mutilated, being much rubbed and minus the cerci. In some respects it seems to agree more closely to the genus *Liphoplus* but in its facial and hind tarsal characters agrees more closely with *Ectatoderus*.

Subfamily TRIGONIDINÆ.

107. Cyrtoxiphus gundlachi Saussure.

Cyrtoxiphus gundlachi Sauss., Miss. Scient. Mex., Orthopt., p. 373 (1870).

A single male specimen received from H. D. Chipman is referred here.

108. Cyrtoxiphus vittatus Bolivar?

Cyrtoxiphus vittatus Bol., Mem. Soc. Zool. France., I, p. 159 (1888).

A pair of little crickets belonging to a second species of this genus from Trinidad are referred doubtfully to *vittatus* since this species seems to be quite generally distributed throughout the West Indies. Mr. Chipman was the collector.

Subfamily ŒCANTHINÆ.

109. Ectecous cantans Saussure.

Ectecous cantans Sauss., Biol. Cent. Amer. Orthopt., I, p. 244, pl. XII, figs. 8, 9, 10 (1899).

I have a single male specimen which has been determined as this species. It was collected by Chipman.

110. Œcanthus immaculatus, new species.

A long, slender-bodied, pale, greenish-white species without any trace of black dots or other markings on face or basal antennal joints. Tegmina reaching tip of hind femora, the wings caudate, fully 4 mm. longer than the elytra. Hind

tibiæ provided with three rather conspicuous spines on inner side of apical third, and two less conspicuous ones on outer side. Pronotum about twice as long as broad, the greatest width immediately above the base of anterior legs. Ovipositor rather heavy and with the apical portion gently upturned; anal stylets longer than ovipositor, quite slender, and roundly bent downwards on outer third.

Length of body, 13.5 mm.; of pronotum, 2.9 mm.; of tegmina, 12 mm.; of wings, 16 mm.; of hind femora, 10 mm.

Habitat. — ♀ 1, Island of Trinidad, West Indies, H. B. Chipman collector. (Coll. L. Bruner.)

Subfamily ENEOPTERINÆ.

111. Apithes annulicornis Saussure.

Apithes annulicornis Sauss., Miss. Scient. Mex., Orthopt., p. 491 (1870).

A single female specimen collected by Chipman on the Island of Trinidad.

112. Aphonus silens Saussure?

Aphonus silens Sauss., Melang. Orthopt. Gryll., p. 805 (1878).

I find a single rather large gryllid among the collections obtained by Chipman on the Island of Trinidad which is referred here with some doubt.

In addition to the insects listed and described on the preceding pages there are at least four or five additional forms which I have not yet determined. Two or three belong to the Tettiginæ as referred to on a previous page, another to the Phaneropterinæ and the last to the Gryllidæ. These will be reported upon later in a separate paper.

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EDITORIAL.

The April issue of our interesting contemporary, *Entomological News*, contains much matter devoted to our criticism of the work of its editor. We feel a sense of amusement at the editor's efforts to "save his face." We would repeat that until Dr. Skinner produces a better classification of the Hesperiidæ, he must accept the one advanced by us, or abandon all generic names and simply list the species of Skippers in any order that pleases him. The generic names he uses cannot be defended. We notice he has not attempted it. Dr. Skinner persists in crediting the new classification to us. It is original with Scudder and Watson. It was Mabille's imperfect presentation of it, as applied to the American forms, that induced us to attempt the subject. Dr. Skinner makes certain criticisms of the characters used, with which, in part, we agree. It is probable that we are aware of more imperfections in the system than Dr. Skinner is, owing to his lack of critical study of genera. His dogmatic utterances that this species is more nearly related to that, etc., although placed by us in different genera, are not due to actual knowledge. Dr. Skinner knows nothing of the early stages and belittles structure; his assertions are founded solely on his ideas of superficial resemblance. His criticism of the use of secondary sexual characters in generic definition is, perhaps, well made; but everybody uses these convenient characters, except Sir George F. Hampson, and even he uses them for subgenera.

Their use in this case is perfectly sanctioned by custom and the authority of many of the best systematists. It is true that exactly what characters shall be used in generic definition can never be arbitrarily asserted nor established by rule; that will depend upon individual ability and tact. If Dr. Skinner does not like the Scudderian system, let him produce another for comparison with it. No positive advance can be made through wholesale criticism without constructive work.

BOOK NOTICES.

Les Moustiques, Histoire Naturelle et Médicale, Par RAPHAËL BLANCHARD, Professeur à la Faculté de Médecine de Paris, Membre de l'Académie de Médecine. Paris: F. R. de Rudeval, 1905.

The book contains 673 pages in seven chapters and an appendix, including introductory definitions, systematic account of the species, their pathological properties, prophylaxis, methods of collecting and breeding and a list of recently described species (appendix). The general account refers at some length to allied forms, *Simulium*, *Tipula*, *Dixa*, *Chironomus*, etc., with text figures. The Corethridæ are not included as mosquitoes. Theobald's classification is adopted, based as it is largely on unimportant scale characters, although somewhat modified by the introduction in the text of the subfamilies Sabettinæ and Joblotinæ to replace Theobald's nameless sections B and C. This is really a distinct improvement and approximates the classification to that of Lutz, epitomized on page 619. Figures of adults and larvæ are copied from various authors and inserted as text figures. This has resulted in some errors. On page 297 a figure of a larva is given as *confinis* Arrib.; it should be transferred to *jamaicensis* Theob., page 279. Page 403, *Aëdes smithii* should be transferred to *Wyeomyia* in the Sabethinæ. Errors of this nature are liable to occur in a compilation, such as Professor Blanchard's work essentially is, and are due to incomplete following up of the subsequent literature. Professor Blanchard is an enthusiastic follower of Theobald, and he has taken advantage of that author's remarkable ability in the creation of homonyms to propose a number of new and beautifully formed generic terms. He has also changed Theobald's badly made names into the proper grammatical forms, which we think he has no right to do. These names will have to stand as first proposed, bad as they are. Fortunately most of them will fall into the synonymy when the scale

characters on which they are founded are relegated to their proper place of subordination. Professor Blanchard's book is really a mine of information about mosquitoes. We only regret that he did not print his own synoptic tables and classification, which were prepared at much pains as he tells us, but thrown in the waste basket on seeing Theobald's book, in an access of enthusiasm, scarcely deserved, we fear. "Les Moustiques" should be in the hands of every student of mosquitoes.

A Monograph of the Anopheles Mosquitoes of India. By S. P. JAMES, M.B., I.M.S., and W. GLEN LISTON, M.D., I.M.S. Calcutta, 1904.

The authors find twenty-four species of *Anopheles* in India, of which they know the larvæ of eighteen. The adults are figured on a green background, which relieves the white scales beautifully and gives a very fine effect. The species should be easily recognized. Ten of the larvæ are figured. The larvæ all differ from the American species in the greater development of the fan-shaped dorsal tufts, which are present on the second abdominal segment in all cases and in many also on the first abdominal and on the metathorax. The larvæ must therefore have even a closer connection with the surface film of the water than is the case with our species. Most of the species have the front of the head triangularly produced and the antennæ much thickened, though some are more rounded like our species. *A. barbirostris* Van der Wulp is nearest in aspect to ours. The species are divided into two groups: first, with the antennal tuft branched (as in our species), containing three species; second, antennæ without branched hair, containing fifteen species. The first group is subdivided by the frontal hairs being simple or branched; the second by the presence or absence of the fan-shaped tuft on the thorax. The details of the frontal hairs and the fan-shaped tufts are used to separate the species. Six types of *Anopheles* eggs are shown (p. 39), which differ remarkably in the development and position of the "floats." This structure is present in all, though in *A. turkhudi* Liston it is reduced to a little dorsal ellipse near one pole of the egg. The authors reject Theobald's genera of the Anophelinæ founded on scale characters (with their reasons for rejection given in detail) and place all the species in *Anopheles*. They nevertheless divide them into ten groups on general affinity, but without any very sharp diagnostic characters.